14. (New) A process according to claim 8, further comprising the step of purifying the acrylic acid to reduce the protoanemonin content to not more than 10 ppm followed by the strong alkali treatment.

REMARKS

In the Action, claims 1-9 are rejected. In response, claims 1, 4 and 8 are amended, and new claims 10-14 are added. Thus, the pending claims in this application are claims 1-14, with claims 1 and 8 being independent.

Claim 1 is amended to recite that the acrylic acid is obtained by a process to reduce the protoanemonin content to not more than 10 ppm. Claim 8 is amended in a similar manner and to recite that the strong alkali treatment is with the use of alkali metal hydroxides to treat acrylic acid that contains not less than 10 ppm of an aldehyde. Support for the amendments to claim 8 are found on page 6, lines 9-12, page 8, lines 17-22, and page 9, line 22 through page 10, line 12 of the specification.

Claim 4 is amended to clarify that the strong alkali treatment is by treating the acrylic acid with a molar excess of an alkali metal hydroxide. Support for this amendment is found on page 9, line 22 through page 10, line 12.

New claims 10-14 are added to recite additional features of the invention. For example, claim 10 depends from claim 8 to recite the step of treating the acrylic acid with an excess of the strong alkali as disclosed on page 9, line 22 through page 10, line 12. Claims 11 and 12 depend from claim 1 directly or indirectly to recite the step of purifying the acrylic acid by distillation in the presence of an aldehyde treating agent and where the aldehyde treating agent is a hydrazine compound, respectively, as disclosed on page 6, lines 12-28. Claim 13 depends from claim 1 to recite that the resulting water-absorbent resin has a liquid permeation quantity of not less than 100 g/g under load of 0.3 psi over 10 minutes. Support for this feature is found on page 18, lines

25-28 and page 38, lines 4 and 24-25. Claim 14 depends from claim 8 to recite the protoanemonin content as in claim 1.

In view of these amendments and the following comments, reconsideration and allowance are requested.

Rejections Under 35 U.S.C. § 112

Claims 1-9 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, the Action objects to the term "characterized in" as being indefinite. Claims 1 and 18 are amended to delete this phrase to overcome this rejection.

Claim 4 is rejected as being indefinite for reciting the neutralization ratio of the acrylic acid being more than 100 mol%. Claim 4 is amended to clarify that the alkali is added a molar excess to neutralize the acrylic acid. This language is consistent with page 10 of the specification which discloses that the neutralization of the acrylic acid is in the presence of an excess amount of the alkali so that the amount of alkali is able to treat more than 100% of the acrylic acid. Thus, it is clear that claim 4 as originally filed refers to an excess amount of the alkali needed to neutralize the acrylic acid.

In view of these amendments, the claims are in proper form under 35 U.S.C. § 112, second paragraph.

Rejection Under 35 U.S.C. § 102

Claims 1-9 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,444,744 to Fujimaru et al. Fujimaru et al. is cited for disclosing a water-absorbent resin and a method of making the resin where the monomer component has a hydroquinone or benzoquinone content of less than 0.20 ppm. The Action contends that each of the claimed limitations are expressly disclosed in Fujimaru et al.

Fujimaru et al. is relevant to the extent that water-absorbent resins are produced and that acrylic acid can be distilled. For the reasons discussed hereinafter, the conventional distillation of Fujimaru et al. does not reduce the protoanemonin content to within the claimed range. A general disclosure of "distillation" does not inherently produce acrylic acid having the claimed limits for the impurities.

Claim 1 specifically recites a process for producing a water-absorbent resin comprising the step of polymerizing a monomer including acrylic acid and/or its salt where the acrylic acid has a protoanemonin content of not more than 10 ppm. Fujimaru et al. does not disclose or suggest a protoanemonin content of the acrylic acid. Therefore, Fujimaru et al. does not expressly disclose the process of claim 1 as suggested in the Action.

As amended, claim 8 recites a process for producing a water-absorbent resin by polymerizing a component including acrylic acid where the acrylic acid has an aldehyde content of not less than 10 ppm and where the raw acrylic acid is treated with an alkali metal hydroxide before the polymerization step. Fujimaru et al. does not disclose or suggest the combination of these steps. In particular, Fujimaru et al. does not disclose the acrylic acid as a raw material having not less than 10 ppm of an aldehyde as claimed. Therefore, Fujimaru et al. is silent regarding the protoanemonin content of claim 1 or the aldehyde content of claim 8.

The present invention is directed to the discovery that the properties of the water-absorbent resin are improved where the resin is produced from an acrylic acid having a protoanemonin content of not more than 10 ppm as recited in claim 1. The invention is also directed to a process for producing a water-absorbent resin where the resulting resin has a neutralization of not less than 50 mol%. The Action does not identify where in Fujimaru et al. there is a disclosure either expressly or inherently of reducing the protoanemonin content within the claimed range. The Action instead refers generally to the reference to distillation and crystallization and the hydroquinone or benzoquinone content of the acrylic acid. However, the

claimed invention is not concerned with reducing the content of hydroquinone or benzoquinone as in Fujimaru et al. Therefore, the hydroquinone or benzoquinone content of Fujimaru et al. is not relevant to the claimed invention. Furthermore, the Action provides no basis for the suggestion that the distillation to remove the benzoquinone or hydroquinone inherently reduces the protoanemonin content as in the claimed invention.

Fujimaru et al. is directed to a process for producing a water-absorbent resin where hydroquinone and benzoquinone are added as a polymerization inhibitor during the purification step. As disclosed in column 10 of Fujimaru et al., the hydroquinone is added in such amounts that it can be removed during the purification step. Fujimaru et al. provides no suggestion that the purification step is able to reduce the protoanemonin content to the claimed amounts as in the present invention. Instead, Fujimaru et al. is only concerned with reducing the hydroquinone or benzoquinone content which inhibit the polymerization of the acrylic acid. Moreover, Fujimaru et al. suggests that when hydroquinone and benzoquinone are not used, then conventional purification of acrylic acid can be used.

As disclosed in the specification, the prior purification and distillation steps used to purify the acrylic acid do not reduce the protoanemonin content as in the present invention. As disclosed in the Examples and Comparative Examples in the specification, purifying the acrylic acid by a simple distillation as in the prior processes does not reduce the protoanemonin content as claimed. For example, the Production Examples 1, 2 and 3 on pages 23-25 of the specification demonstrate that the distillation produces acrylic acid having a protoanemonin content within the claimed range while the distillation process of Comparative Production Examples 1, 2 and 3 result in a protoanemonin content of 30 ppm, 13 ppm and 17 ppm, respectively. Thus, these examples demonstrate that all distillation processes do not inherently produce the claimed protoanemonin content. Accordingly, the Action has not established that the acrylic acid of Fujimaru et al. has a protoanemonin content of not more than 10 ppm.

As disclosed on page 6, lines 12-28 of the specification, refers to a "super purified acrylic acid". Moreover, this passage also notes that conventional purified acrylic acid contains furfural and/or protoanemonin in amounts that lower the performance of the water-absorbent resin. As disclosed on page 4, line 25 to page 5, line 26 and page 34 in the paragraphs following Table 1, the polymerization time, the residual monomer content and the water extractable content increase as the protoanemonin content increases.

The protoanemonin and furfural content of the claimed process is reduced not only by the purification step, but also by the oxidation condition of the propylene and/or propane. The protoanemonin and furfural are by-products of the oxidation reaction. The hydroquinone and benzoquinone of Fujimaru et al. are added as polymerization inhibitors and are not by-products of the oxidation reaction. Furthermore, Fujimaru et al. does not disclose an oxidation condition. Accordingly, Fujimaru et al. does not disclose the claimed process.

Fujimaru et al. also fails to disclose a process where the acrylic acid has a furfural content of not more than 10 ppm as recited in claim 2. As disclosed in comparative Example 4 of the specification, the distillation *per se* does not ensure that the furfural content is reduced to not more than 10 ppm. Comparative production Example 4 specifically discloses that the same distillation as in production Example 1 without the use of hydrazine hydrate results in a furfural content of 240 ppm, which is clearly outside the claimed range of claim 2. Fujimaru et al. also fails to disclose the step of subjecting the acrylic acid to an alkali treatment as in claim 3 or treating the acrylic acid with an excess of an alkali metal hydroxide as in claim 4 in combination with the process of claim 1. Fujimaru et al. also fails to disclose the aqueous solution polymerization of claim 5, the crosslinking step of claim 6, or the resulting water-absorbent resin having a water-absorption capacity of not less than 25 g/g under load as in claim 7 in combination with the process of claim 1. Accordingly, claims 1-7 are not anticipated by Fujimaru et al.

Claim 8 is directed to a process of producing a water-absorbent resin from an acrylic acid monomer component where the acrylic acid is obtained by catalytic gas phase oxidation of propylene and/or propane and contains not less than 10 ppm of an aldehyde and subjecting the acrylic acid to treatment with an alkali metal hydroxide before polymerization. As discussed above, Fujimaru et al. is concerned with reducing the hydroquinone and benzoquinone content of the acrylic acid. There is no suggestion in Fujimaru et al. of treating acrylic acid that contains not less than 10 ppm of an aldehyde as claimed. Accordingly, Fujimaru et al. does not anticipate claim 8.

Furthermore, Fujimaru et al. discloses that the neutralization can be carried out before, during or after the polymerization. However, Fujimaru et al. does not disclose reducing the content of the aldehyde or furfural by treating with an alkali metal hydroxide. The content of the aldehyde or furfural in the acrylic acid is not reduced by neutralizing the acrylic acid during or after the polymerization as in Fujimaru et al. Therefore, Fujimaru et al. does not reduce the aldehyde content to within the claimed range by treating with an alkali metal hydroxide.

Fujimaru et al. also fails to disclose the strong alkali treatment at a temperature of not lower than 40°C as in claim 9, treating the raw acrylic acid with an excess of the alkali metal hydroxide as in claim 10, in combination with the process of claim 8. Fujimaru et al. further fails to disclose the step of purifying the acrylic acid to reduce the protoanemonin content to not more than 10 ppm followed by the strong alkali treatment as in claim 14 or purifying the acrylic acid to reduce the furfural content to not more than 10 ppm as in claim 15, in combination with the process of claim 8. Accordingly, these claims are not anticipated by Fujimaru et al.

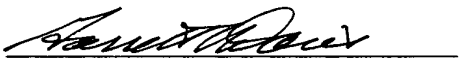
Claim 11 depends from claim 1 to recite the step of distilling the acrylic acid in the presence of an aldehyde treating agent to purify the acrylic acid while claim 12 recites the aldehyde treating agent as being a hydrazine compounds. Claim 13 depends from claim 1 to recite that the resulting water-absorbent resin has a liquid permeation quantity of not less than

100 g/g under load. These features are not disclosed or suggested in combination with the process of claim 1 in Fujimaru et al. Accordingly, these claims are allowable over Fujimaru et al.

The secondary references referred to in paragraph 5 of the Action do not disclose the claimed process. U.S. Patent No. 6,187,872 to Yanase et al., U.S. Patent No. 5,981,070 to Ishizaki et al. and U.S. Patent No. 6,071,976 to Dairoku et al. do not suggest reducing the impurities in the acrylic acid. Specifically, these patents do not disclose reducing the protoanemonin or furfural content of the acrylic acid as in the claimed invention.

In view of these amendments and the above comments, claims 1-14 are allowable over the art of record. Reconsideration and allowance are requested.

Respectfully submitted,



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